Analysis of the yield data in Poland

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Institute of Soil Science and Plant Cultivation
State Research Institute

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4. Department of Ecology and Weed Control
5. Department of Agricultural Microbiology
6. Department of Systems and Economics of Crop Production
7. Department of Soil Tillage and Fertilization
8. Department of Forage Crop Production
9. Department of Cereal Crop Production
10. Department of Breeding and Production of Special Plants
11. Department of Plant Nutrition and Fertilization

Osiny Experimental Station
Grabów Experimental Station
Baborówko Experimental Station
The crop area structure in Poland

Source: National Statistical Office

Wheat

Rye

Potatoes

Maize for grain

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The administrative structure and crop yield data

**1975-1998**
Crop yield data can be obtained for national, województwa (vovivodsip), powiat level

**From 1999**
Crop yield data can be obtained for only województwa (voviwodsip) and national level
Winter wheat
\[ i_1 = 76.3 + 0.176 \times cwb_9 - 0.000381 \times cwb_9^2 + 0.22 \times cwb_{10} - 0.000543 \times cwb_{10}^2 - 0.000645 \times cwb_9 \times cwb_{10} \]
\[ i_7 = 74.15 + 4.9 \times t_5 - 0.22 \times t_5^2 + (i_6 - 100) \]
\[ i_{30} = 8.85 + 2.44 \times h_8 - 0.000237 \times h_8^3 - 0.0006 \times h_8 \times h_7 + (i_{29} - 100) \]

\[ WI_{\text{winter wheat}} \text{ (%) } = \sum (i_1..i_{30}) \]

Potato
\[ i_1 = L - A \times p_{cbw}^2 \]
\[ i_4 = L + H \times cwb_5 - J \times cwb_5^2 + K \times cwb_6 - 0.00158 \times cwb_6^2 + L \times cwb_6^3 + 3M \times cwb_5 \times cwb_6^3 + i_3 - 100 \]

\[ WI_{\text{potato}} \text{ (%) } = \sum (i_1..i_{14}) \]

- \( i \) — partial indices constituting the WI
- \( t \) — air temperature (°C)
- \( h \) — relative humidity (%)
- \( p \) — precipitation (mm)
- \( cwb \) — climatic water balance (mm)
Impact of climate change on the yield level in Poland
(Difference from the average yield 1970-1995)
Weather index (WI) of the winter wheat over the years 1956-2006 in Poland

“100” is the mean WI value over a multiyear period

Results from on-going project (IUNG-PIB): Impact on extreme weather condition on agriculture

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Results from on-going project (IUNG-PIB):
Impact on extreme weather condition on agriculture

Weather index WI of potato in Poland over the years 1956-2006
Data available for the analysis of the yield variability in Poland from experimental fields

Experimental Station Osiny
1. Field experiment with agricultural systems (ecological, integrated, intensive)
   Years: 1996-2008 (13 years)
   Crops: potato, winter wheat, spring barley

2. Field experiment with different level of intensity in technology
   Years: 1996-2008
   Crops: winter wheat, winter triticale, winter rye

Experimental Station - Grabów
Long term field experiment: comparison of efficiency of nitrogen
Years: 1980-2008
Crops: potato, winter wheat, spring barley, maize, clover with grasses

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Data available for the analysis of the yield variability in Poland from experimental fields

Experimental Station Osiny

Years: 1996-2008 (13 years)

Crops: potato, winter wheat, Spring barley, winter rape

Yield variability in field experiment with agricultural systems (ecological, integrated, intensive)
Data available for the analysis of the yield variability in Poland from experimental fields

Experimental Station Osiny

Difference from average yield (1996-2007) in field experiment with agricultural systems (ecological, integrated, intensive)

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Data available for the analysis of the yield variability in Poland from experimental fields

Experimental Station Puławy - Osiny

The yields in field experiment with different level of intensity of technologies
The effects of scale on crop variability

Wintet wheat yield in two experiments in Osiny

- Winter wheat (0.25 ha)
- Winter wheat (1 ha, 4 varieties)

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The effects of scale on crop variability

Coefficients of variability (V in %) of winter wheat yield in the years 1956-1990 as related to the area size (a in ha).
From left: field experiment, farms, counties, small and large voivodships in Poland, mean in Central Europe (The Netherlands, Denmark, FRG, GDR, Poland, Czechoslovakia, Austria, Hungary)
December 2005, Osiny near Puławy
Thank you for your attention